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Practitioner's Docket No. LAR 16039-1

PATENT APPLICATION

OIPE JC88 APR 2 2 2005 PATENT & TRADEMARK OFFICE

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Ji Su et al.
Application No.: 09/696,526
Filed: October 23, 2000
For: Non-Uniform Thickness Electroactive Device

Art Unit No.: 2834
Examiner: Karen B. Addison

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23351

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FEE TRANSMITTAL
For FY 2005

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT ($) 500.00

Complete if Known	
Application Number	09/696,526
Filing Date	October 23, 2000
First Named Inventor	Ji Su
Examiner Name	Karen B. Addison
Art Unit	2834
Attorney Docket No.	LAR 16039-1

OIPE APR 22 2005

METHOD OF PAYMENT (check all that apply)

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FEE CALCULATION

1. BASIC FILING, SEARCH, AND EXAMINATION FEES

Application Type	FILING FEES Fee ($)	Small Entity Fee ($)	SEARCH FEES Fee ($)	Small Entity Fee ($)	EXAMINATION FEES Fee ($)	Small Entity Fee ($)	Fees Paid ($)
Utility	300	150	500	250	200	100	
Design	200	100	100	50	130	65	
Plant	200	100	300	150	160	80	
Reissue	300	150	500	250	600	300	
Provisional	200	100	0	0	0	0	

2. EXCESS CLAIM FEES

Fee Description	Fee ($)	Small Entity Fee ($)
Each claim over 20 (including Reissues)	50	25
Each independent claim over 3 (including Reissues)	200	100
Multiple dependent claims	360	180

Total Claims ______ - 20 or HP = **Extra Claims** ______ x **Fee ($)** ______ = **Fee Paid ($)** ______
HP = highest number of total claims paid for, if greater than 20.

Indep. Claims ______ - 3 or HP = **Extra Claims** ______ x **Fee ($)** ______ = **Fee Paid ($)** ______
HP = highest number of independent claims paid for, if greater than 3.

Multiple Dependent Claims **Fee ($)** ______ **Fee Paid ($)** ______

3. APPLICATION SIZE FEE

If the specification and drawings exceed 100 sheets of paper (excluding electronically filed sequence or computer listings under 37 CFR 1.52(e)), the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

Total Sheets ______ - 100 = **Extra Sheets** ______ / 50 = **Number of each additional 50 or fraction thereof** ______ (round **up** to a whole number) x **Fee ($)** 250.00 = **Fee Paid ($)** 0.00

4. OTHER FEE(S) **Fees Paid ($)**

Non-English Specification, $130 fee (no small entity discount) ______

Other (e.g., late filing surcharge): Filing a Brief in Support of an Appeal 500.00

SUBMITTED BY					
Signature	Kurt G. Hammerle	Registration No. (Attorney/Agent)	36,819	Telephone	757-864-2470
Name (Print/Type)	Kurt G. Hammerle			Date	April 22, 2005

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APPEAL BRIEF (37 CFR § 41.37)

Sir:

Pursuant to the Notice of Appeal filed on March 24, 2005, Appellants present herewith their Brief directed to the errors of law and fact contained in the Examiner's Final Rejection dated October 28, 2004.

An oral hearing is not requested.

REAL PARTY IN INTEREST

The Real Party in Interest is the United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

RELATED APPEALS AND INTERFERENCES

To the best knowledge of Appellants, there are no appeals or interferences related to this Appeal.

STATUS OF CLAIMS

Independent claims 1, 10, 16, 18, and 19 and dependent claims 2-9, 11-15, 17, and 20-35 are pending in this application. Claims 10, 16, 18 and 19 have been allowed. Claims 1-9, 11-15, 17 and 20-35 have been rejected.

Although the March 21, 2005 "Advisory Action Before the Filing of an Appeal Brief" indicates under Section 7 that claims 1-3, 5-9, 11-14, 17, 20-23 and 30-33 are rejected, the entirety of the record indicates that claims 1-9, 11-15, 17 and 20-35 stand rejected. Because the Examiner has not explicitly allowed claims 4, 15, 24-29 and 34-35, Appellants assume that those claims continue to be rejected and that the listing of rejected claims in the Advisory Action was in error.

Claims 1-9, 11-15, 17 and 20-35 are under the present appeal.

STATUS OF AMENDMENTS

The Examiner did not enter the amendments to claims 1, 9 and 17 proposed by Appellants in their response under 37 C.F.R § 1.116 filed January 28, 2005. Specifically, the Examiner stated that the proposed amendments were not entered because they raised new issues that would require further consideration and/or search. Further, the Examiner stated that "further search and consideration is need (sic) with respect to the admended (sic) claims 'wherein the thickness of each non-uniform layer varies along one or more of the non-uniform thickness layer's length and width.'"

SUMMARY OF CLAIMED SUBJECT MATTER

The present invention is an electroactive device, comprising:

at least two layers of material, each layer having a length, width and thickness dimension; wherein at least one layer is an electroactive material and wherein at least one layer of electroactive material is of non-uniform thickness; and means for bonding the layers to one another. (Claim 1) Two or more layers of material may be electroactive. (Claim 11) The electroactive material may respond to electrical activation. (Claim 14). Further, the electroactive material may be selected from the group consisting of polymers, ceramics, and composites. (Claim 15) Further, the electroactive material may be an electrostrictive graft elastomer comprising a backbone molecule which is a non-crystallizable, flexible macromolecular chain, and a grafted polymer forming polar graft moieties with backbone molecules, the polar graft moieties having been rotated by an applied electric field and sustained in the rotated state until the electric field is removed. (Claim 16) One layer of material may be non-electroactive. (Claim 12) The non-electroactive material may be selected from the group consisting of polymers, ceramics, composites, and metals. (Claim 13)

The means for bonding the layers may be selected from the group consisting of chemical bonding, physical bonding, mechanical bonding, and biological bonding. (Claim 21) The chemical bonding means may employ a chemical adhesive. (Claim 22)

The at least one layer of electroactive material may further comprise a means to supply electrical signals across the thickness thereof. (Claim 2) The applied amplitude of the electrical signals may control the range of device motion. (Claim 5) The means to supply electrical signals may be at least one electrode positioned on each of the upper and lower surfaces of the at least one layer of electroactive material. (Claim 3) Additionally, the at least one electrode may be a conductive polymer material having elasticity comparable to the at least one layer of electroactive material and having good adherence to the at least one electroactive material. (Claim 4)

The non-uniform thickness of at least one layer may enable a controlled contouring of the activated device. (Claim 6) The controlled contouring may comprise bending (Claim 7), or torsion of the activated device (Claim 8).

The non-uniform thickness of at least one layer may be a function of at least one dimension of the layer. (Claim 9) The non-uniform thickness may also be a function of both the length and width of the layer. (Claim 10) The cross-section of at least one non-uniform layer may be defined by a function of the distance along the length of the layer (Claim 17); by a function of the distance along the width of the layer (Claim 18) or by a function of both the distance along the length of the layer and the distance along the width of the layer (Claim 19).

The layers of the electroactive device may be conformable for use in folded deployable devices. (Claim 20)

The electroactive device itself may be a membrane to be deformed (Claim 23) and the membrane may be a reflector (Claim 24).

At least one electroactive device may be positioned along the surface of a structure to modify the surface's contour. (Claim 25) The surface to be modified may be a skin surface (Claim 26), a display panel (Claim 28), or an optical index layer for a liquid crystal display (Claim 29). Such electroactive device may produce traveling waves. (Claim 27)

At least one electroactive device may be integrated within the surface of a structure to modify the surface's contour. (Claim 30) The surface to be modified may be a skin surface. (Claim 31) Such electroactive device may produce traveling waves. (Claim 32)

The electroactive device may perform at least one function selected from the group consisting of shaping, tuning, positioning, controlling and deforming. (Claim 33)

The electroactive device may be a component of a micro-electromechanical system (Claim 34) or a nano-electromechanical system (Claim 35).

The electroactive device can be produced in various sizes, ranging from large structural actuators to microscale or nanoscale devices. The applied voltage to the device in combination with the non-uniform thickness of the at least one electroactive layer

controls the contour of the actuated device. The effective electric field is a mathematical function of the local layer thickness. Therefore, the local strain and the local bending/torsion curvature are also a mathematical function of the local thickness. Hence the thinnest portion of the actuator offers the largest bending and/or torsion response. Tailoring of the layer thicknesses can enable complex motions to be achieved. (Specification at page 4, lines 7-17)

Actuation devices are used for many applications, including aerospace, fluid flow, and biomedical. Space applications include robotics, miniature rovers, and the shaping, tuning, positioning, controlling, and deforming of membrane structures. Membrane inflatable and deployable space structures are used by the government and commercially as reflectors, antennas, solar arrays, satellites, solar sails, etc. Although actuation devices are widely used, many challenges exist which limit their performance for high precision applications. Factors affecting precision include surface smoothness, deviation from desired surface profile, surface deformations due to thermal fluctuations, and accurate membrane positioning. Additionally, hydrofoils and airfoils that can optimize their surface shape at varying flow rates are desirable to, for example, increase lift, reduce noise levels, lower vibrations and reduce drag. Other potential uses of actuation devices include precise positioning of display panels and optical index layers. To operate most effectively in the aforementioned applications, actuation devices require sufficient force and strain, and often need to produce complex motions that may include both bending and torsion. (Specification at page 2, lines 3-19)

Existing devices capable of providing complex motion response utilize surface electrode patterning and/or polymer laminates having tailored lamina properties and orientations, such as described in U.S. Patent Number 4,868,447. It is desirable to obtain complex motion response without requiring tailored surface electroding or laminate design. (Specification at page 3, lines 12-16)

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The grounds of rejection to be reviewed by the Board of Patent Appeals and Interferences are:

1. **Whether claims 1-3, 5-9, 11-14, 17, 20-23, 25-27, and 30-33 should be rejected under 35 U.S.C. § 102(b) as being anticipated by *Micheron* (U.S. 4,400,634).**

2. **Whether claims 4, 15, 24, 28, 29, and 34-35 should be rejected under 35 U.S.C. § 103(a) as being unpatentable over *Micheron* in view of *Pelrine* (Pelrine et al, Electrostriction of Polymer Films for Microactuators, 1997 Micro Electro Mechanical Systems Proc., 1/1997, page 238-43).**

ARGUMENT

Issue 1. - Whether claims 1-3, 5-9, 11-14, 17, 20-23, 25-27, and 30-33 should be rejected under 35 U.S.C. § 102(b) as being anticipated by *Micheron* (U.S. 4,400,634).

It is the position of the Examiner expressed in the "Detailed Action" mailed October 28, 2004 that: (note: no corrections to typographical errors have been made)

With respect to claims 1 and 21-22, the reference discloses in fig. 1-3 an electroactive device comprising two layers (1,2) of material wherein one layer is an electroactive material and wherein at least one layer is of non-uniform thickness (2). The reference discloses the use of a conductive epoxy (glue). With respect to claim 2, 3 and With respect to claim 5, it is an inherent property of electroactive devices that the 14, the reference discloses electrical signal (6). amplitude control the range of motion. With respect to claims 6-8, the non-uniform thickness layer inherently has these properties. With respect to claims 9 and 17, fig. 3 discloses that the non-uniform thickness is function of length. With respect to claim 11, the reference discloses two electroactive layers in fig. 1-3. With respect to claims 12 and 13, the reference discloses the use of a conductive epoxy. With respect to claim 20, no structural limitations are added in this claim. With respect to claims 23, 25-27 and 30-33, the reference discloses that the electroactive device is used for loudspeaker as disclosed in (see abstract). (Page 2 of Detailed Action mailed October 28, 2004)

4. Applicant's arguments filed 6/24/04 have been fully considered but they are not persuasive.
In response to the applicant's arguments that Micheron fails to disclose two electroactive layers is noted.
However, Micheron clearly disclose in the abstract, that the bimorph structure, deformation is controlled in a linear manner by a voltage.
In response to the applicant argument that Micheron fails to disclose two electroactive

layers wherein, one layer is of non-uniform thickness is noted.
However, Micheron clearly shows in fig. 1 two electroactive polymer wherein, one layer (2) is of non-uniform thickness. (Page 5 of Detailed Action mailed October 28, 2004)

5. In response to the applicant's argument, that thickness of the electroactive polymer is a function of width or length is noted. However, the applicant claims does not include that the thickness of the layer is a function of the width or length. It is the claims that define the claim invention, and it is the claim, not the specifications that are anticipated or unpatentable. (Page 5 of Detailed Action mailed October 28, 2004)

Independent Claim 1

A careful reading of *Micheron* indicates that neither electroactive layer (1) nor (2) is taught or suggested to be of non-uniform thickness.

Micheron teaches two electroactive layers – layers (1) and (2) in Figs. 1 and 2 and layers (1) and (20) in Fig. 3. These layers consist of two dielectrics (1) and (2) in Figs. 1 and 2, and two dielectrics (1) and (20) in Fig. 3 - made from polymer materials in sheet form. (Col. 3, lines 4-6; col. 3, line 22 and line 29; and col. 3, lines 46-47) The two dielectrics are mechanically coupled by a connection ensuring the transmission of the tangential forces of dielectric 1 to dielectric (2) or (20), as applicable. (Col. 3, lines 11-15 and col. 3, lines 48-50) Although layer (1) and layer (2) in Fig.1 are illustrated as having two different thicknesses from each other, there is no teaching or suggestion in *Micheron* that layer (1) or layer (2) is itself of a non-uniform thickness - either along its length or across its width or along both length and width. Fig. 1 shows the uniform thickness electroactive dielectric layers 1 and 2 separated by electrode 5. (Col. 3, lines 4-18) Layer (1) is a constant thickness and layer (2) is a constant thickness. Although layer (1) and layer (2) are different thicknesses from one another, neither layer (1) nor layer (2) is itself of non-uniform thickness - which is what is clearly claimed in claim 1. There is no indication, either in the figures or within the text of the specification, that an electroactive layer itself has a non-uniform thickness – along width, along length, or along both length

and width. Like assertions are also made by Appellants for layers (1) and (20) in Fig. 3.

Nowhere in *Micheron* is non-uniform thickness of an electroactive layer taught or suggested. Additionally, measurement of the thickness of layer (2) in Fig. 1 confirms that layer (2) has a constant thickness along its length. In no instance does the thickness of any electroactive layer vary.

Claim 1 of the present application clearly states the limitation "wherein at least one layer of electroactive material is of <u>non-uniform</u> thickness." While the claims define the invention, it is clearly established that claims are to be interpreted in conjunction with their accompanying specification. Figs. 1A and 1B are described in *Brief Description of the Drawings* at page 5, lines 19-24, as illustrating an embodiment of a "non-uniform thickness" actuator and Figs. 1A and 1B clearly illustrate the "non-uniform thickness", specifically along length, of electroactive layer 112. Additionally, Figs. 4 and 5 clearly illustrate electroactive layers having non-uniform thickness, specifically having thickness variation along length. Furthermore, the specification at page 9, lines 25-29, in referring to Fig. 6, clearly indicates that the thickness of a layer can vary as any function of length, any function of width, or as any function of both length and width. (Amendment to specification and addition of Fig. 6 made in January 10, 2003 response to the Office Action dated July 10, 2002)

<u>Dependent Claims 2-3, 5-9, 11-14, 17, 20-23, 25-27, and 30-33</u>

Claims 2-3, 5-9, 11-14, 17, 20-23, 25-27 and 30-33, due to their dependence from claim 1, each include the limitation of "at least one layer of electroactive material is of non-uniform thickness." Such limitation is neither taught nor suggested by *Micheron*, as argued above.

<u>Issue 2</u> - **Whether claims 4, 15, 24, 28, 29, and 34-35 should be rejected under 35 U.S.C. § 103(a) as being unpatentable over *Micheron* in view of *Pelrine* (Pelrine et al, Electrostriction of Polymer Films for Microactuators, 1997 Micro Electro Mechanical Systems Proc., 1/1997, page 238-43).**

It is the position of the Examiner expressed in the Detailed Action mailed October 28, 2004 that: (note: no corrections to typographical errors have been made)

With respect to claim 4, the reference discloses in fig. 3 an electroactive device comprising two layers(1,2) of material with layer 2 of non-uniform thickness bonded together by polymer epoxy glue. The reference does not disclose polymer electrodes. Pelrine et al disclose polymer electrodes in the last full paragraph on page 240 for the purpose of providing compliant electrical connections. It would have been obvious to one of ordinary skill in the art to use the polymer electrodes of Pelrine et al in the device of Schafft for the purpose of providing compliant electrical connections. With respect to claim 15, the reference does what type of material is being used. The Examiner takes Official Notice that polymers, ceramics, and composites would have been well known. The court has found that the selection of a known material based on its suitability for its intended use is obvious. In re Leshin, 227 F.2d 197, 125 USPQ 416 (CCPA 1960). Sinclair & Carroll Co. Interchemical Corp., 325 U.S. 327, 65 USPQ 297 (1945). It would have been obvious to one of ordinary skill in the art to use polymers, ceramics, and composites for the purpose of utilizing their well-documented properties. With respect to claims 24, 28, and 29, the reference only discloses the device for use in a speaker. The Examiner takes Official Notice that reflectors and display panels would have been well known. The reference does indicate that the non-uniform thickness makes the electroactive device stronger. It would have been obvious to one of ordinary skill in the art to use the device of Schafft in a reflector or display panel for purpose of providing an actuator with increased strength. With respect to claims 34 and 35, the reference does not disclose the same scale.

The reference does indicate that the non-uniform thickness makes the electroactive device

stronger. In Gardner v. TEC Systems, Inc., 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), ced. denied, 469 U.S. 830, 225 USPQ 232 (1984), the Federal Circuit held that, where the only difference between the prior art and the claims was a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device. It would have been obvious to one of ordinary skill in the art to scale down the device of fig. 3 of Schafft for the purpose of providing micro and nano-scale device with improved strength.

6. In response to applicant's argument, that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See In re Fine, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and In re Jones, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). (Page 5 of Detailed Action mailed October 28, 2004)

<u>Claims 4, 15, 24, 28, 29, and 34-35</u>

Objections under 35 U.S.C. § 103(a) for claims 4, 15, 24, 28, 29 and 34-35 rely on the assertion that *Micheron* teaches an electroactive device comprising an electroactive layer of non-uniform thickness. As asserted above, there is no figure or portion of the specification in *Micheron* that makes such teaching or even a suggestion. Further, M.P.E.P. §2143.03 provides that "if an independent claim is non-obvious under 35 U.S.C. §103, then any claim depending therefrom is non-obvious." In re Fine, 837 F.2d 1071, 5USPQ2d 1596 (Fed. Cir. 1988)."

Additionally, the Applicants respectfully bring to the Board's attention several instances of reference to *Schafft* within the 35 U.S.C. § 103 rejections. The Applicants' understanding, per paragraph one of the Detailed Action dated March 24, 2004 is that Applicants' prior arguments with respect to the rejections of claims in view of *Schafft* were considered to be persuasive and all rejections pertaining thereto were withdrawn.

The rejection of all claims based on *Micheron* or *Pelrine* is accordingly without basis and should not be sustained.

Respectfully submitted,

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April 22, 2005

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APPENDIX OF CLAIMS

Claims:

1. (previously presented) An electroactive device, comprising:

at least two layers of material, each layer having a length, width and thickness dimension; wherein at least one layer is an electroactive material and wherein at least one layer of electroactive material is of non-uniform thickness; and

means for bonding the layers to one another.

2. (original) The electroactive device of claim 1, wherein the at least one layer of electroactive material further comprises means to supply electrical signals across the thickness thereof.

3. (original) The electroactive device of claim 2, wherein the means to supply electrical signals is at least one electrode positioned on each of the upper and lower surfaces of the at least one layer of electroactive material.

4. (original) The electroactive device of claim 3, wherein the at least one electrode is a conductive polymer material having elasticity comparable to the at least one layer of electroactive material and having good adherence to the at least one electroactive material.

5. (original) The electroactive device of claim 2, wherein the applied amplitude of the electrical signals controls the range of device motion.

6. (previously presented) The electroactive device of claim 1, wherein non-uniform thickness of at least one layer enables a controlled contouring of the activated device.

7. (original) The electroactive device of claim 6, wherein the controlled contouring comprises bending of the activated device.

8. (original) The electroactive device of claim 6, wherein the controlled contouring comprises torsion of the activated device.

9. (original) The electroactive device of claim 1, wherein the non-uniform thickness of at least one layer is a function of at least one dimension of the layer.

10. (previously presented) An electroactive device, comprising:

at least two layers of material, each layer having a length, width and thickness dimension, wherein at least one layer is an electroactive material and wherein at least one layer is of non-uniform thickness, and

means for bonding the layers to one another;

wherein the non-uniform thickness of at least one layer is a function of both the length and width of the layer.

11. (original) The electroactive device of claim 1, wherein two or more layers of material are electroactive.

12. (original) The electroactive device of claim 1, wherein one layer of material is non-electroactive.

13. (original) The electroactive device of claim 12, wherein the non-electroactive material is selected from the group consisting of polymers, ceramics, composites and metals.

14. (original) The electroactive device of claim 1, wherein the electroactive material is a material that responds to electrical activation.

15. (original) The electroactive device of claim 1, wherein the electroactive material is selected from the group consisting of polymers, ceramics, and composites.

16. (previously presented) An electroactive device, comprising:

at least two layers of material, each layer having a length, width and thickness dimension, wherein at least one layer is an electroactive material and wherein at least one layer is of non-uniform thickness; and

means for bonding the layers to one another;

wherein the electroactive material is an electrostrictive graft elastomer comprising a backbone molecule which is a non-crystallizable, flexible macromolecular

chain, and a grafted polymer forming polar graft moieties with backbone molecules, the polar graft moieties having been rotated by an applied electric field and sustained in the rotated state until the electric field is removed.

17. (original) The electroactive device of claim 1, wherein the cross-section of at least one non-uniform layer is defined by a function of the distance along the length of the layer.

18. (previously presented) An electroactive device, comprising:

at least two layers of material, each layer having a length, width and thickness dimension, wherein at least one layer is an electroactive material and wherein at least one layer is of non-uniform thickness; and

means for bonding the layers to one another;

wherein the cross-section of at least one non-uniform layer is defined by a function of the distance along the width of the layer.

19. (previously presented) An electroactive device, comprising:

at least two layers of material, each layer having a length, width and thickness dimension, wherein at least one layer is an electroactive material and wherein at least one layer is of non-uniform thickness; and

means for bonding the layers to one another;

wherein the cross-section of at least one non-uniform layer is defined by a function of both the distance along the length of the layer and the distance along the width of the layer.

20. (original) The electroactive device of claim 1, wherein the layers of the device are conformable for use in folded deployable devices.

21. (original) The electroactive device of claim 1, wherein the means for bonding the layers is selected from the group consisting of chemical bonding, physical bonding, mechanical bonding, and biological bonding.

22. (original) An electroactive device as claimed in claim 1, wherein the means for bonding the layers is a chemical bonding means employing a chemical adhesive.

23. (original) The electroactive device of claim 1, wherein the device itself is a membrane to be deformed.

24. (original) The electroactive device of claim 23, wherein the membrane is a reflector.

25. (original) The electroactive device of claim 1, wherein at least one device is positioned along the surface of a structure to modify the surface's contour.

26. (original) The electroactive device of claim 25, wherein the surface to be modified is a skin surface.

27. (original) The electroactive device of claim 26, wherein the device produces traveling waves.

28. (original) The electroactive device of claim 25, wherein the surface to be modified is a display panel.

29. (original) The electroactive device of claim 25, wherein the surface to be modified is an optical index layer for a liquid crystal display.

30. (original) The electroactive device of claim 1, wherein at least one device is integrated within the surface of a structure to modify the surface's contour.

31. (original) The electroactive device of claim 30, wherein the surface to be modified is a skin surface.

32. (original) The electroactive device of claim 30, wherein the device produces traveling waves.

33. (original) The electroactive device of claim 1, wherein the device performs at least one function selected from the group consisting of shaping, tuning, positioning, controlling and deforming.

34. (original) The electroactive device of claim 1, wherein the device is a component of a micro-electromechanical system.

35. (original) The electroactive device of claim 1, wherein the device is a component of a nano-electromechanical system.

APPENDIX OF EVIDENCE

CITED CASES

(1) *In re Leshin*, 227 F.2d 197, 125 USPQ 416 (CCPA 1960) Examiner entered into the record in 10-28-2004 Office Action page 3, paragraph 1.

(2) *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and In re Jones, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992) Examiner entered into the record in 10-28-2004 Office Action page 5, paragraph 6.

(3) *In Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), ced. Denied, 469 U.S. 830, 225 USPQ 232 (1984) Examiner entered into the record in 10-28-2004 Office Action page 4, paragraph 2.

(4) *Sinclair & Carroll Co. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945) Examiner entered into the record in 10-28-2004 Office Action page 3, paragraph 1.

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